

## ABSTRACT

A magnetic memory is disclosed. The magnetic memory includes a first magnetic tunneling junction and a reference magnetic tunneling junction. The first magnetic tunneling junction includes a first ferromagnetic layer, a second ferromagnetic layer and a first insulating layer between the first ferromagnetic layer and the second ferromagnetic layer. The reference magnetic tunneling junction includes a third ferromagnetic layer, a fourth ferromagnetic layer and a second insulating layer between the third ferromagnetic layer and the fourth ferromagnetic layer. The magnetic memory also includes means for comparing a first output of the first magnetic tunneling junction with a reference output of the reference magnetic tunneling junction.